ISSN: 0272-6343

Electromagnetics

Volume 20
2000

electromagnetics

EDITOR-IN-CHIEF

H. Y. David Yang
Department of Electrical Engineering and Computer Science
University of Illinois at Chicago

EDITORIAL BOARD

N. Balakrishnan
Indian Institute of Science, India
Daniel Du Zutter
University of Ghent, Belgium
Roberto D. Graglia
Politechnico Di Torino, Italy
Wolfgang J. R. Hoefer
University of Victoria, Canada
Tzyy-Sheng Horng
National Sun-Yat Sen University, Taiwan, ROC
Jianming Jin
University of Illinois at Urbana-Champaign, USA
Yehuda Leviatan
Technion-Israel Institute of Technology, Israel
Hisamatsu Nakano
Hosei University, Japan
Peter Russer
Institut für Hochfrequenztechnik, Germany
G. Ya Slepyan
Institute of Nuclear Problems, Belarus
Oleg A. Tretyakov
Kharkov State University, Ukraine
Sergei Tretyakov
St. Petersburg Technical University, Russia
Ching-kuang Tzuang
National Chiao-Tung University, Taiwan, ROC
Nikolaos K. Uzunoglu
National Technical University of Athens, Greece
Werner Weiglhoger
University of Glasgow, UK
Wen Xun Zhang
Southeast University, China

Abstracted and/or Indexed in: CSA Electronics & Communications Abstracts; CSA Solid State & Superconductivity; Engineering Information, Inc.; Sci Search; Science Citation Index; Research Alert; Current Contents/ Engineering, Computing, & Technology.

Subscription Information

Electromagnetics is published bimonthly by Taylor & Francis Ltd., 11 New Fetter Lane, London EC4P 4EE, UK.
Annual Subscription, Volume 20, 2000
Print ISSN 0272-6343. Institutional: US $470, UK £285. Individual: US $190, UK £115.
Production, Advertising, and Subscriptions Office: Taylor & Francis, 325 Chestnut Street, Philadelphia, PA 19106. Tel -215-625-8900, Fax- 215-625-2940. **Subscriptions telephone number:** 215-269-0400. **Production Editor:** Rachel I. Ravitsky. **Advertising Coordinator:** Brian Goulstone.

For a complete guide to Taylor & Francis Group's journal and book publishing programs, and details on advertising in our journals, visit our website: **http://www.taylorandfrancis.com**.

Periodicals postage paid at Jamaica NY 11431. US Postmaster: Send address changes to **Electromagnetics**, Publications Expediting, Inc. 200 Meacham Avenue, Elmont, NY 11003.

Dollar rates apply to subscribers in all countries except the UK and the Republic of Ireland where the sterling price applies. All subscriptions are payable in advance and all rates include postage. Subscriptions are entered on an annual basis; i.e., January to December. Payment may be made by sterling check, dollar check, international money order, National Giro, or credit card (Amex, Visa, Mastercard/Access).

Orders originating in the following territories should be sent directly to: **India:** Universal Subscription Agency Pvt. Ltd, 101–102 Community Centre, Malviya Nagar Extn, Post Bag No. 8, Saket, New Delhi 110017. **Japan:** Kinokuniya Company Ltd, Journal Department, PO Box 55, Chitose, Tokyo 156. **USA, Canada, and Mexico:** Taylor & Francis Inc., 325 Chestnut Street, Philadelphia, PA 19106. **UK and all other territories:** Taylor & Francis Ltd, Rankine Rd., Basingstoke, Hampshire RG24 8PR.

Copyright © 2000 Taylor & Francis. All rights reserved. No part of this publication may be reproduced, stored, transmitted, or disseminated in any form or by any means without prior written permission from Taylor & Francis Inc. Taylor & Francis Inc. grants authorization for individuals to photocopy copyright material for private research use on the sole basis that requests for such use are referred directly to the requester's local Reproduction Rights Organization (RRO), such as the Copyright Clearance Center in the USA or the Copyright Licensing Agency in the UK. This authorization does not extend to any other kind of copying by any means, in any form, and for any purpose other than private research use.The publisher assumes no responsibility for any statements of fact or opinion expressed in the published papers or advertisements.

♾ The paper in this publication meets the requirements of the ANSI Standard Z39.48-1984 (Permanence of Paper), effective with Volume 1, Number 1, 1998.

Electromagnetics

Volume 20 Tables of Contents

Volume 20, Number 1

A 3D Interpolation Model for the Calculation of the Sommerfield Integrals to Analyze Dielectric Resonators in a Multilayered Medium 1
Jingyang Chen, Ahmed A. Kishk, and Allen W. Glisson

Synthesis of Inhomogeneous Dielectric, Dispersionless TEM Lenses for High-Power Application 17
C. E. Baum and A. P. Stone

An Efficient Surface Impedance Boundary Condition for the FDTP Modeling of Surface-Emitting Lasers with Bragg Sticks 29
Jishi Ren and R. Jennifer Hwu

Plane-Wave Propagation in Decomposable Bianisotropic Media 43
Leila H. Puska and Ismo V. Lindell

Etalon Boundary-Value Problem Technique for Three-Dimensional Diffraction Problems 55
Fridrikh G. Bass, Anatoly Ya. Slepyan, and Gregory Ya. Slepyan

Effects of Double Helical Conductances of Surfaces on Multiple Scatterings of Eccentrically Two-Layered Bianisotropic Cylinder Array: The Case of the TE_z-Wave Incidence 65
Wen-Yan Yin and Le-Wei Li

Volume 20, Number 2

A Corrected Physical-Optics Solution to 3-D Wedge Diffraction 79
Athanasios I. Papadopoulos and Dimitrios P. Chrissoulidis

Effects of Bistatic Multiple Surface Scattering from Perfectly Conducting Rough Surfaces 99
Chin-Yuan Hsieh

Surface-Wave Elimination in Integrated Circuit Structures with Artificial Periodic Materials 125
Hung-Yu David Yang

Analysis for Magnetic Field and Axial Coupling of Multipole Disk Magnets by Fourier Transform 131
Mingsheng Zhang, Xiaolin Zhao, Bingcu Cai, and Zongguang Wang

Electromagnetic Dyadic Green's Function for a Multilayered Homogeneous Lossy Dielectric Spherical Head Model for Numerical EMC Investigation 141
S. M. S. Reyhani and R. J. Glover

The Perfectly Matched Layer as a Synthetic Material with Active Inclusions 155
S. A. Tretyakov and T. G. Kharina

Volume 20, Number 3

Closed-Form Evaluation of Flux Integrals Appearing in a Finite Element Solution of the 3D Poisson Equation with Dipole Sources 167
Kassem A. Awada, David R. Jackson, Stephen B. Baumann, Donald R. Wilton, and Jeffrey T. Williams

Uploaded Q Factors, Energy Storage, and Power Dissipation of Axially Symmetric and Assymmetric Modes of Shielded Dielectric Resonators 187
M. Zinieris and R. Sloan

Prediction of IEM Model for Backscattering Enhancement 205
Chin-Yuan Hsieh

Extended Electromagnetic Continuity Condition and Generalized Huygens Principle 223
I. V. Lindell, S. A. Tretyakov, and K. I. Nikoskinen

Analysis of Electrically Charged Small Slot-Fed Substrate Lens Antennas Using the Physical Optics Hydid Method 243
Joey Bray and Langis Roy

Characteristic-Based Finite-Volume Time-Domain Method for Scattering by Coated Objects 257
Dan Jiao, Jian-Ming Jin, and J. S. Shang

Electromagnetics

Volume 20 Tables of Contents

Volume 20, Number 4

Guest Editor's Comments: Special Issue on Spiral Antennas 269
Hisamatsu Nakano

Some Array Applications of the Curl Antenna 271
L. Shafai

An Outer-Fed Spiral Antenna Array Radiating a Circularly Polarized Conical Beam 295
Kazuhide Hirose, Takehisa Wada, and Hisamatsu Nakano

Omnidirectional Beam Formation Using Spiral Antennas above a Conducting Cylinder 311
Kazuo Nakayama and Hisamatsu Nakano

The Spiral as a Traveling Wave Structure for Broadband Antenna Applications 323
Johnson J. H. Wang

A Printed Spiral Antenna on a Finite-Sized Dielectric Substrate for Generating a Circularly Polarized Conical Beam 343
Toru Kawano, Ryuhei Tago, and Hisamatsu Nakano

Extremely Broadband Slot Spiral Antenna with Shallow Reflecting Cavities 357
M. W. Nurnberger and J. L. Volakis

An Integral Equation for Dielectric-Coated Wires—Application to Spiral Antennas 377
Tran Van Su

Volume 20, Number 5

Artificial Neural Networks for the Resonant Resistance Calculation of Electrically Thin and Thick Rectangular Microstrip Antennas 387
K. Güney, M. Erler, and S. Sagiroglu

Truncation Bounds for the Fast Multipole Method Based on Analytic Fourier Series 401
Luc Knockaert and Daniel de Zutter

A New Estimating Method in Observing the Electron Density Profile with Peak and Valley by Using the Ray Path Method 409
Kuniyuki Motojima, Makoto Ohki, and Shogo Kozaki

Plane Wave Diffraction by a Resistive Step Joining Two Parallel Half-Planes with Different Face Impedances 423
Filiz Birbir and Alinur Büyükaksoy

Implementation of Floquet Boundary Conditions in FDTD Analysis of Periodic Phased Array Antennas with Skewed Grid 445
Zhengqing Yun and Magdy F. Iksander

Volume 20, Number 6

Magnetically Textured Composite Materials as Elements of Electromagnetic Wave Absorbers 453
N. E. Kasantseva, A. T. Ponomerenko, V. G. Shevchenko, and C. Klason

An Extrapolated Version of the Gordon's Interpolation Applied to the Method of Moments 467
Philippe De Doncker

Electomagnetic Waves in a Material with Simultaneous Mirror-Conjugated and Racemic Chirality Characteristics 481
A. Lakhtakia and W. S. Weiglhofer

Diffraction of Electromagnetic Plane Wave by a Perfectly Conducting Cylinder Using Physical Theory of Diffraction with Transition Currents 489
K. Hongo and H. Kobayashi